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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,685	08/20/2003	Trung T. Doan	2269-3414.7US (97-1039.07)	6457
24247	7590	07/28/2004	EXAMINER NADAV, ORI	
TRASK BRITT P.O. BOX 2550 SALT LAKE CITY, UT 84110			ART UNIT 2811	PAPER NUMBER

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/644,685

Applicant(s)

DOAN ET AL.

Examiner

ori nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
- 4a) Of the above claim(s) 11, 19, 20, 29, 38-55, 62, 71 and 72 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 12-18, 21-28, 30-37, 56-61 and 63-70 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 8/20/03 & 12/1/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-10, 12-18, 21-28, 30-37, 56-61, and 63-70 on 6/21/2004 is acknowledged.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 8 and 21-28, 30-37, 56-61, 63-70 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16 and 1-15 of copending Application No. 10/191,222. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1-3, 8 and 21-28, 30-37, 56-61, 63-70 are broader than corresponding claims 16 and 1-15 of copending Application No. 10/191,222, and thus allow unjustified or improper timewise extension of the "right to exclude" to be granted by copending Application No. 10/191,222.

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This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 and 12-18 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-15 of copending Application No. 10/191,22 in view of McCollum (5,057,451).

Claims 1-15 of copending Application No. 10/191,22 teach substantially the entire claimed structure, as recited in claims 1-10 and 12-18, except an insulative layer overlying said first conductive layer and exposing at least part of said at least one protrusion. McCollum teaches in figure 1c and related text an insulative layer 14 overlying a first conductive layer 12 and exposing at least part of at least one protrusion. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form an insulative layer overlying said first conductive layer and exposing at least part of said at least one protrusion in the device recited in claims 1-15 of copending Application No. 10/191,22 in order to provide better protection to the first conductive layer.

This is a provisional obviousness-type double patenting rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 8, 21, 37 and 56 are rejected under 35 U.S.C. 102(b) as being anticipated by McCollum (5,057,451).

Regarding claims 1, 3 and 8, MaCollum teaches in figure 1c and related text an integrated circuit device comprising:

a first conductive layer 12 including at least one protrusion;

an insulative layer 14 overlying the first conductive layer and exposing at least part of the at least one protrusion, and

a programmable resistive material 16 in direct contact with said at least one protrusion of said first conductive layer,

wherein the exposed part of the at least one protrusion comprises a smaller cross-sectional area than a remaining part of the at least one protrusion of said at least one conductive layer,

a second conductive layer 28 above the programmable resistive material,

Regarding claim 21, MaCollum teaches in figure 1c and related text an integrated circuit device comprising:

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a first electrode 12 having a first portion and a second portion, a width of the first electrode narrowing substantially and continuously in a direction extending from the second portion toward said first portion of the first electrode; a layer of programmable resistive material 16 in contact with said first portion of said first electrode; and a second electrode 28 coupled to the layer of programmable resistive material.

Regarding claim 56, MaCollum teaches in figure 1c and related text an integrated circuit device comprising:

a first conductive layer 12 on a substrate 10, wherein the first conductive layer includes at least one raised portion;

a programmable resistive material 16 in direct contact with said at least one raised portion of said first conductive layer, and

a second conductive layer 28 above said programmable resistive material.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2, 4-7, 9-10, 12-18, 22-28, 30-36, 57-61 and 63-70, are rejected under 35 U.S.C. 103(a) as being unpatentable over MaCollum in view of Ovshinsky et al. (5,296,716).

MaCollum teaches in figure 1c and related text substantially the entire claimed structure, as applied to claims 1, 21 and 56, except a programmable resistive material comprises a chalcogenide material.

Ovshinsky et al. teach in figure 1 and related text a programmable resistive material 36 comprises a chalcogenide material. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a programmable resistive material comprises a chalcogenide material in MaCollum's device in order to improve the characteristics and operation of the device. The combination is motivated by the teachings of Ovshinsky et al. who point out the advantages of using a programmable resistive material comprises a chalcogenide material.

Regarding claims 2, 5, 9, 10, 12, 13, 14, 24, 27-28, 30-32, 58, 61, 63-65 and 70, the device of MaCollum and Ovshinsky et al. includes a programmable resistive material formulated to be reversibly cycled between at least two different resistive states,

wherein the chalcogenide material is selected from a group consisting of tellurium (Te), germanium (Ge), antimony (Sb), and combinations thereof,

wherein the second conductive layer 38 comprises titanium nitride or carbon, a conductive barrier layer between said programmable resistive material and said second conductive layer,

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a second conductive layer above the programmable resistive material and an interlayer dielectric over the second conductive layer, the interlayer dielectric including an aperture that exposes at least a portion of an upper surface of said second conductive layer, and

conductive grid interconnect within said aperture, wherein

said conductive grid interconnect is selected from the group consisting of titanium, titanium nitride and aluminum.

Regarding claims 6-7, 15-18, 25-26, 33-36, 59-60 and 66-69, MaCollum and Ovshinsky et al. do not teach the chalcogenide material includes tellurium (Te), germanium (Ge), and antimony (Sb) in a ratio of $\text{Te}_a\text{Ge}_b\text{Sb}_{100-(a+b)}$, where a, b, and $100-(a+b)$ are in atomic percentages which total 100% of the constituent elements and $a \leq 70$ and $15 \leq b \leq 50$, wherein $40 \leq a \leq 60$ and $17 \leq b \leq 44$, and a portion of said at least one protrusion comprises a frustoconical tip having a frustum lateral dimension of at least 0.1 and 0.4 microns and a height of approximately 2000Å.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a chalcogenide material includes tellurium (Te), germanium (Ge), and antimony (Sb) in a ratio of $\text{Te}_a\text{Ge}_b\text{Sb}_{100-(a+b)}$, where a, b, and $100-(a+b)$ are in atomic percentages which total 100% of the constituent elements and $a \leq 70$ and $15 \leq b \leq 50$, wherein $40 \leq a \leq 60$ and $17 \leq b \leq 44$, and a portion of said at least one protrusion comprises a frustoconical tip having a frustum lateral dimension of at least 0.1 and 0.4 microns and a height of approximately 2000Å in the device of MaCollum

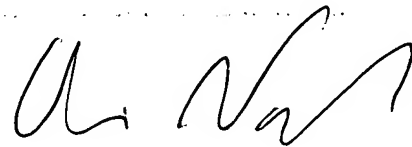
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and Ovshinsky et al., in order to optimize the characteristics of the device since it is within the skills of an artisan to improve the operation and characteristics of the device, subject to routine experimentation and optimization.

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(571) 272-1660**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**



O.N.
7/23/04

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PATENT EXAMINER
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